REMARKS

I. Introduction

Claims 1-13 and 15-22 are pending in the above application.

Claims 2-11 have been withdrawn.

Claims 15 and 20-22 stand rejected under 35 U.S.C. § 112 ¶ 1.

Claims 1, 12, 13 and 16-19 stand rejected under 35 U.S.C. § 103.

No prior art rejections have been asserted against claims 15 and 20-22, and hence, such claims are considered to be patentable over the prior art.

Claim 1 is the only independent claim under review.

II. Amendments

Claim 14 has been cancelled without prejudice or disclaimer and claims 15 and 20 have been amended to be dependent on claim 1. Accordingly, the rejection of claims 15 and 20-22 under 35 U.S.C. § ¶1, which has been indicated on page 3 of the Office action to be based on their dependence on now cancelled claim 14, is believed to be moot.

Claim 1 has been amended to further describe the invention recited therein. The amendments to claim 1 are supported at least by page 20, lines 9-14 of the specification. No new matter has been added.

III. Prior Art Rejections

A. The Amended Claims Are Patentable Over The Combination Of Prior Art

Claims 1, 12, 13 and 16-19 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over Applicants Admitted Prior Art (hereafter "APA") in view of Fujii et al (U.S.

Patent 5,476,811) (hereafter "Fujii") in view of Duggan (U.S. Patent 6,072,189) (hereafter "Duggan") as set forth on pages 4-8 of the Office action.

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the ***claimed invention*** where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. Ecolochem Inc. v. Southern California Edison Co., 227 F.3rd 1361, 56 U.S.P.Q.2d (BNA) 1065 (Fed. Cir. 2000); In re Dembiczak, 175 F.3d 994, 999, 50 U.S.P.Q.2D (BNA) 1614, 1617 (Fed. Cir. 1999); In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 U.S.P.Q.2d 1941 (Fed. Cir. 1992). See also MPEP 2143.01.

Neither APA nor Fujii nor Duggan, taken alone or in combination, disclose or suggest the claimed invention of amended claim 1. More particularly, neither APA nor Fujii nor Duggan, taken alone or in combination, disclose or suggest a semiconductor device which contains a graded composition layer provided between the active layer and the third semiconductor layer to have a varying composition, wherein a base electrode is electrically connected to the third semiconductor layer via the graded composition layer and the active layer, and wherein the forbidden band of the active layer is smaller than the forbidden band of the third semiconductor layer, as recited in amended claim 1.

APA discloses in Fig. 17 and its description, a base electrode 910 connected to a base layer 903 via a n-type contact layer 908 and a buried layer 907. See, specification, pp. 2-3. APA further discloses that charges are applied from a base electrode 910 to the base layer 903, an active layer 904 is not electrically interposed between the base electrode 910 and the base layer 903. See, Fig. 17, specification, p. 4, lns 1-16. APA does not disclose a base electrode

electrically connected to the third semiconductor layer via the graded composition layer and the active layer, such as in the present invention. Moreover, APA also fails to teach or suggest the forbidden band of the active layer is smaller than the forbidden band of the third semiconductor layer, and thus the effect of decreasing the contact resistance of the base electrode.

Fujii teaches a method for forming an epitaxial crystallized layer composed of GaAs and including a graded composition layer, and a semiconductor laser device using the epitaxial crystallized layer. However, Fujii merely discloses a semiconductor laser device including a p-type electrode, a p-type semiconductor layer, an active layer, a n-type semiconductor layer and a n-type electrode. Fujii does not disclose the bipolar transistor of the present invention including an emitter, a base, a collector, abase layer and a base electrode. Fujii also fails to teach or suggest a base electrode electrically connected to the third semiconductor layer via the graded composition layer and the active layer and that the forbidden band of the active layer is smaller than the forbidden band of the third semiconductor layer, such as in the present invention.

Duggan teaches a graded composition layer of which composition is changed from AlGaN to InGaN. However, just as Fujii, the invention of Duggan is related to a semiconductor laser device not a bipolar transistor. Moreover, Duggan also fails to disclose a base layer and a base electrode.

As neither APA, Fujii nor Duggan, taken alone or in combination, disclose or suggest all of the limitations of amended claim 1, the combination of APA, Fujii and Duggan, even if considered proper, does not produce the claimed invention and does not render claim 1 unpatentable. As claims 12, 13 and 16-19 are dependent on claim 1, and contain all of the limitations therein, these claims are also not rendered unpatentable by the above combination.

Applicants note that, according to the present invention, as described on page 20, lines 9-14 of the specification, the contact resistance between the base electrode and the third semiconductor layer can be decreased. This capability is not considered to be provided by any of the above combined references.

B. The Asserted Combination Is Improper

The asserted combination of APA, Fujii and Duggan is clearly based on impermissible hindsight as it is only created by following the path blazed by the inventors of the present application.

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there **is some teaching, suggestion, or motivation to do** so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). See also MPEP 2143.01. It should be recognized that the fact that the prior art could be modified so as to result in the combination defined by the claims at bar would not have made the modification obvious unless the prior art suggests the desirability of the modification. In re Deminski, 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986). Recognizing, after the fact, that such a modification would provide an improvement or advantage, without suggestion thereof by the prior art, rather than dictating a conclusion of obviousness, is an indication of improper application of hindsight considerations. Simplicity and hindsight are not proper criteria for resolving obviousness. In re Warner, 379 f.2d 1011, 154, USPQ 173 (CCPA 1967).

The combination of APA, Fujii and Duggan as set forth in the Office action is clearly based on impermissible hindsight. Particularly, Office action appears to rely on both Fujii and Duggan to assert that the use of a graded layer is known and the practice of matching the lattice of a graded layer and another layer is known. However, neither Fujii nor Duggan disclose to use a graded layer as recited by claim 1. The mere disclosure of a graded layer does not disclose or suggest to use the graded layer as recited in Applicant's claims. The Office action appears to only use what was gleaned from Applicant's disclosure to create the asserted combination of references in the attempt to produce the structure recited in claim 1, *i.e.* the Office action merely follows the path blazed by the inventors. Such practice is classic impermissible hindsight.

Notably, as discussed above, none of the combined references, taken alone or in combination, disclose or suggest a desire to decrease the contact resistance between a base electrode and a third semiconductor layer with a graded composition layer and an active layer interposed therebetween, as in the present invention.

The Examiner is respectfully reminded that a rejection under 35 U.S.C. § 103 cannot be based on what might be combined or on what may be possible to be combined, *i.e.* the mere fact that references can be combined or modified is not sufficient to establish a prima facie case of obviousness. See, MPEP 2143.01, third heading. Rather, the desirability of combination itself must be suggested by the prior art. See, MPEP 2143.01, first heading.

IV. Conclusion

Applicant respectfully submits that the application is in condition for allowance, an early indication thereof is respectfully solicited. Should the Examiner have any questions or concerns regarding the amendments presented herein, the Examiner is invited to contact the undersigned representative of the Applicant.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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APPENDIX

IN THE CLAIMS:

Please cancel claim 14 without prejudice or disclaimer.

Please amend claims 1, 15 and 20 as follows:

1. (Twice Amended) A semiconductor light-emitting device comprising:

first and second semiconductor layers each of a first conductivity type;

a third semiconductor layer of a second conductivity type provided between the first and second semiconductor layers;

an active layer provided between the second and third semiconductor layers, the active layer emitting light with charge injected therein from the second and third semiconductor layers; and

a [grade] graded composition layer provided between the active layer and the third semiconductor layer to have a varying composition,

wherein the composition of the [grade] graded composition layer is equal to a composition of the third semiconductor layer at an interface with the third semiconductor layer, and to a composition of the active layer at an interface with the active layer,

wherein a base electrode is electrically connected to the third semiconductor layer via the graded composition layer and the active layer, and

wherein the forbidden band of the active layer is smaller than the forbidden band of the third semiconductor layer.

15. (Amended) The semiconductor light-emitting device of claim 1 [14], wherein regions of the active layer and the graded composition layer lying between the base electrode and the second semiconductor layer are removed.

20 (Amended) The semiconductor light-emitting device of claim 1 [14], wherein the third semiconductor layer is p-type.